2017 Design Training Expo

Unsignalized Intersection Improvement Guide (UIIG)

Mark Doctor and Alan El-Urfali

What is the UIIG?

- Practical guidance for evaluating unsignalized intersections and identifying opportunities to enhance their safety and operational performance
- Web-based (hosted by ITE)
- Presented under two sections:
  - ***Information*** section provides background material and important considerations related to the types, users, common problems and treatments associated with unsignalized intersections
  - ***Toolkit*** provides a number of resources including a Microsoft Excel-based unsignalized intersection assessment and treatment selection tool

Why the UIIG?

UIIG Unsignalized Intersection Improvement Guide

- Each year in the US, nearly 7,000 fatal crashes occur at or are related to intersections
- More than 70% of these fatal crashes occur at unsignalized intersections
- The majority of unsignalized intersections are owned and operated by local agencies, often having few full-time traffic engineers on staff

Benefits of Web-based UIIG

- Allows for continuous revisions
- Better user interaction → more likely to be used
- Offers hyperlinks to other internet resources that provide additional information on variety of related topics
- Capitalizes upon internet-based innovations such as aerial imagery & street-level photography to illustrate real-world examples
- Conducive to sharing tools to assist users in addressing intersection safety

Target Audience

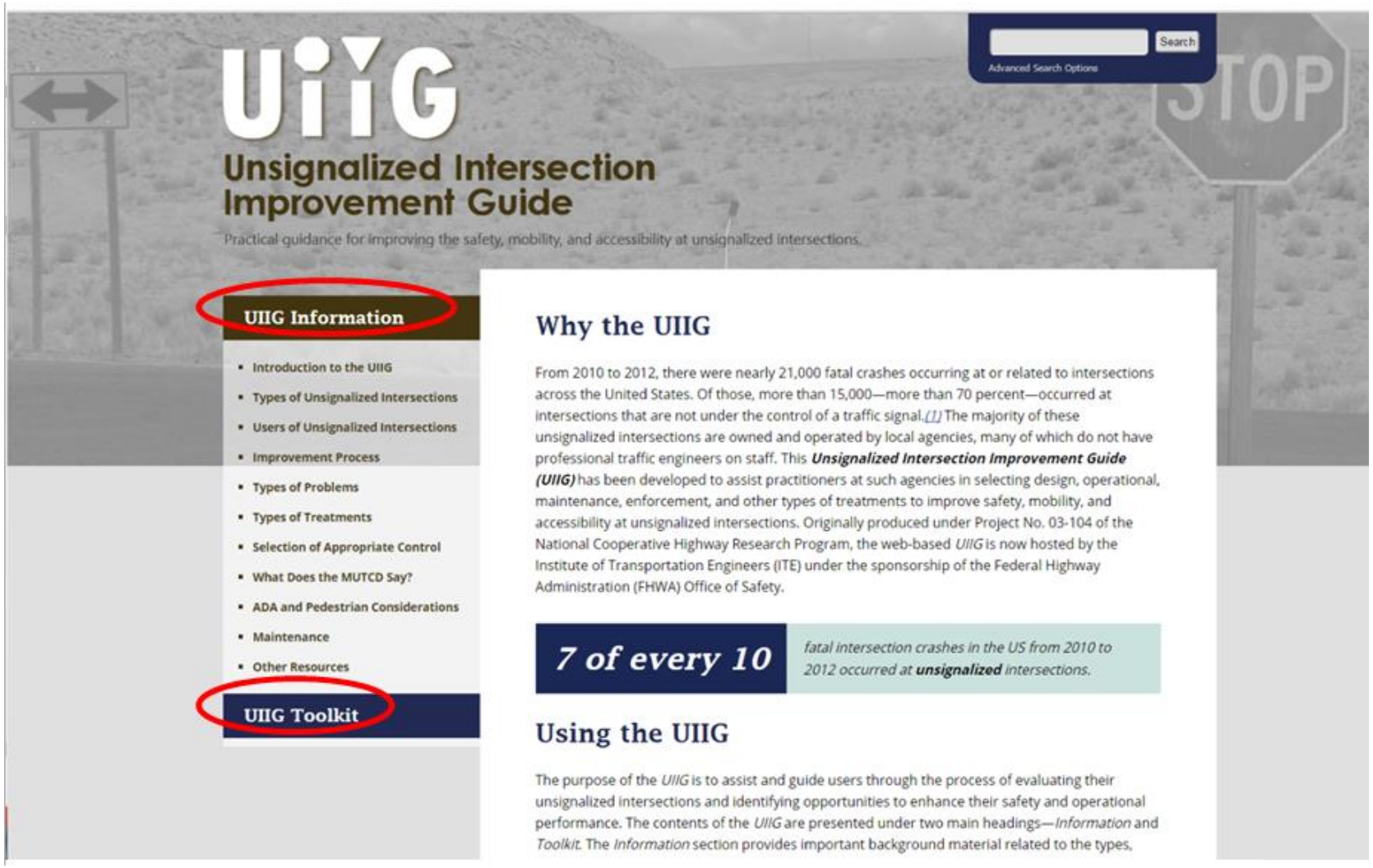
PRIMARY

- Local road-owning agencies
  - Majority of unsignalized intersections under their control
  - Especially valuable to those without transportation engineers on staff

SECONDARY

- State DOTs, large local agencies, consultants
  - Comprehensive nature
  - Provides references on variety of intersection-related topics
  - Valuable resource for individuals without safety training

Two Main Parts



Types of Unsignalized Intersections: Traffic Control

Uncontrolled
"… yield the right-of-way to the vehicle on the right"

YIELD sign controlled
"… concede the right-of-way to vehicles and non-motorists in the intersection"

STOP sign controlled
"… drivers are required to come to a full stop"

Types of Unsignalized Intersections: Geometry

Roundabouts

Residential Traffic Circles

U-Turn Based

Five Step Improvement Process

1. Identify problematic locations
   - Public complaints, Police reports, Agency maintenance staff
2. Crash data analysis and site review
   - Identify the potential problem and contributing factors
3. Identify treatment options
4. Implement affordable treatments
5. Monitor effectiveness over time

5- Step Process

Identify problem intersection(s)

Analyze location(s) to quantify & characterize problem

Identify potential treatments that may address problem

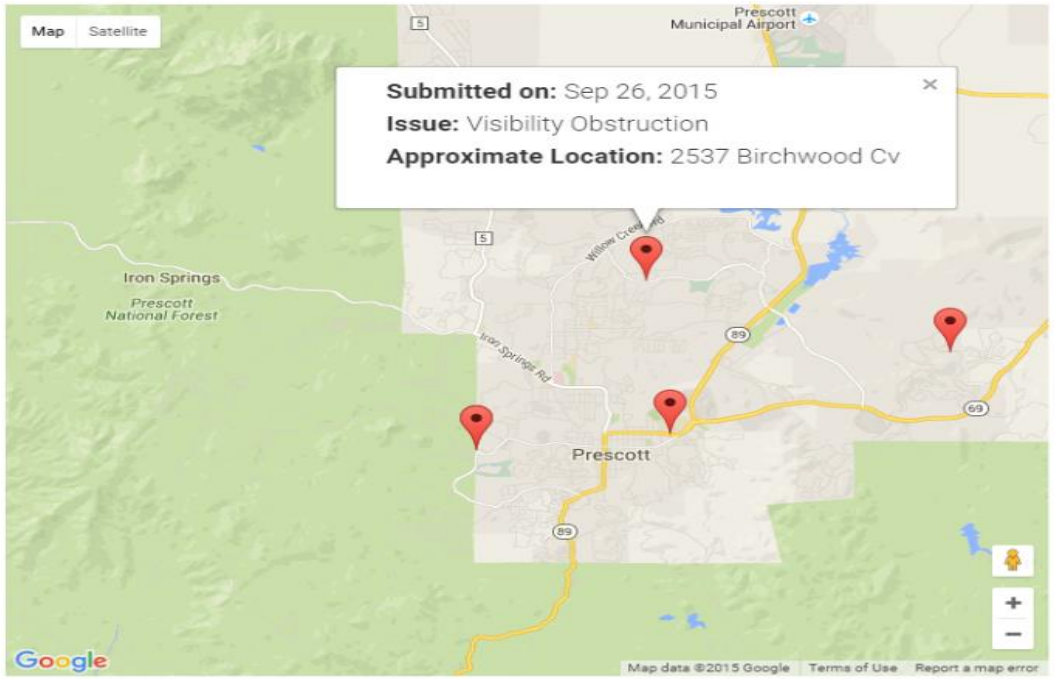
Select/implement cost-effective treatment(s)

Monitor over time & evaluate treatment's effectiveness

Tracking public input

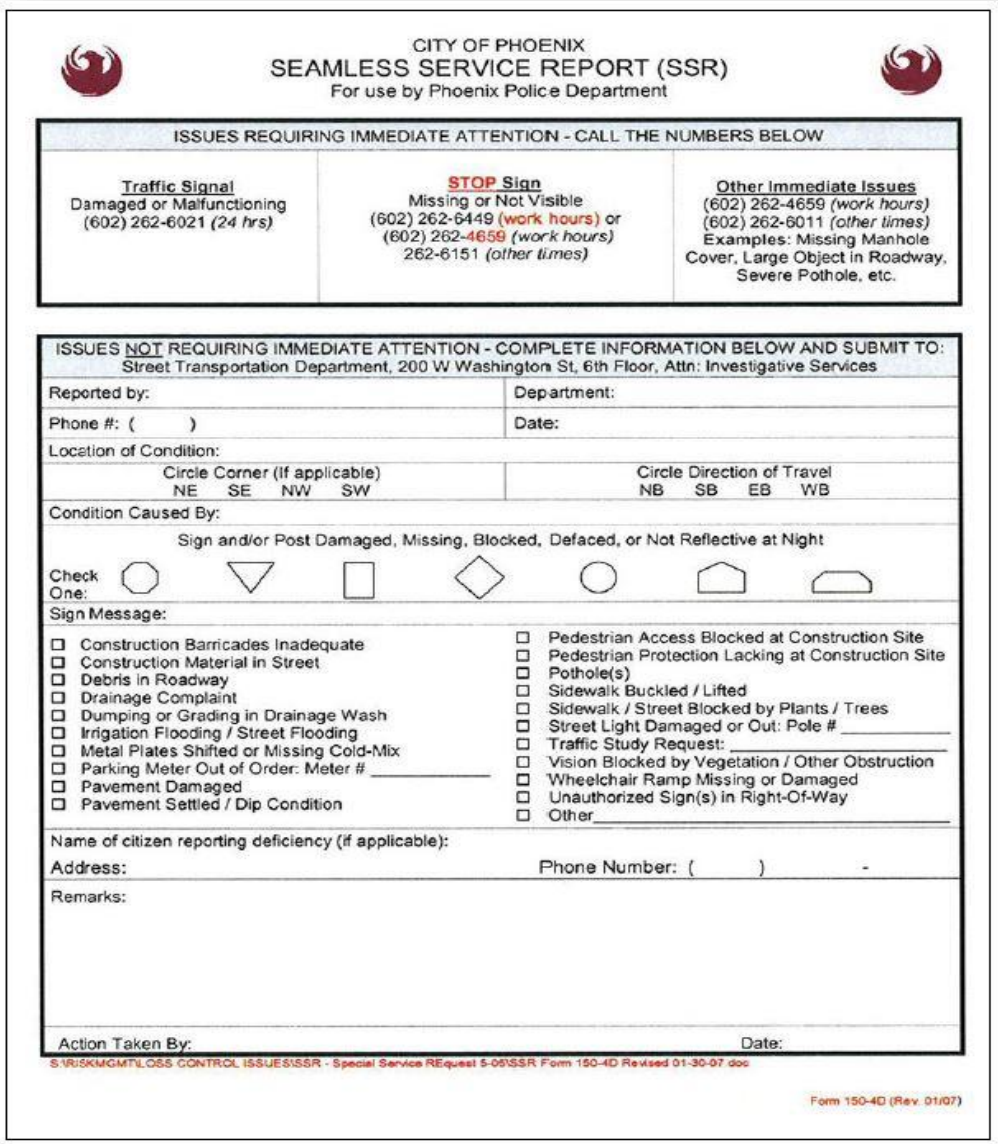
- Ways to receive input:
  - Complaint hotlines
  - Direct telephone lines
  - Online reporting forms
  - Apps for mobile devices

- UIIG example:
  - Prescott, AZ → allows users to pinpoint locations on map; other reported issues also shown



Police input mechanisms

- Road-maintaining agencies should establish communication channels with field officers to solicit input
- UIIG Example: City of Phoenix *Seamless Service Report* form



CITY OF PHOENIX
SEAMLESS SERVICE REPORT (SSR)
For use by Phoenix Police Department

ISSUES REQUIRING IMMEDIATE ATTENTION - CALL THE NUMBERS BELOW

Traffic Signal	STOP Sign	Other Immediate Issues
Damaged or Malfunctioning (602) 262-6021 *(24 hrs)*	Missing or Not Visible (602) 262-6449 (work hours) or (602) 262-4659 *(work hours)* 262-6151 *(other times)*	(602) 262-4659 *(work hours)* (602) 262-6011 *(other times)* **Examples:** Missing Manhole Cover, Large Object in Roadway, Severe Pothole, etc.

ISSUES NOT REQUIRING IMMEDIATE ATTENTION - COMPLETE INFORMATION BELOW AND SUBMIT TO:
Street Transportation Department, 200 W Washington St, 6th Floor, Attn: Investigative Services

Reported by: | Department:

Phone #: ( ) | Date:

Location of Condition:

Circle Corner (If applicable) NE SE NW SW | Circle Direction of Travel NB SB EB WB

Condition Caused By:

Sign and/or Post Damaged, Missing, Blocked, Defaced, or Not Reflective at Night

Check One:

Sign Message:

- ☐ Construction Barricades Inadequate
- ☐ Construction Material in Street
- ☐ Debris in Roadway
- ☐ Drainage Complaint
- ☐ Dumping or Grading in Drainage Wash
- ☐ Irrigation Flooding / Street Flooding
- ☐ Metal Plates Shifted or Missing Cold-Mix
- ☐ Parking Meter Out of Order: Meter # _____
- ☐ Pavement Damaged
- ☐ Pavement Settled / Dip Condition
- ☐ Pedestrian Access Blocked at Construction Site
- ☐ Pedestrian Protection Lacking at Construction Site
- ☐ Pothole(s)
- ☐ Sidewalk Buckled / Lifted
- ☐ Sidewalk / Street Blocked by Plants / Trees
- ☐ Street Light Damaged or Out: Pole # _____
- ☐ Traffic Study Request: _____
- ☐ Vision Blocked by Vegetation / Other Obstruction
- ☐ Wheelchair Ramp Missing or Damaged
- ☐ Unauthorized Sign(s) in Right-Of-Way
- ☐ Other_____

Name of citizen reporting deficiency (if applicable):

Address: Phone Number: ( ) -

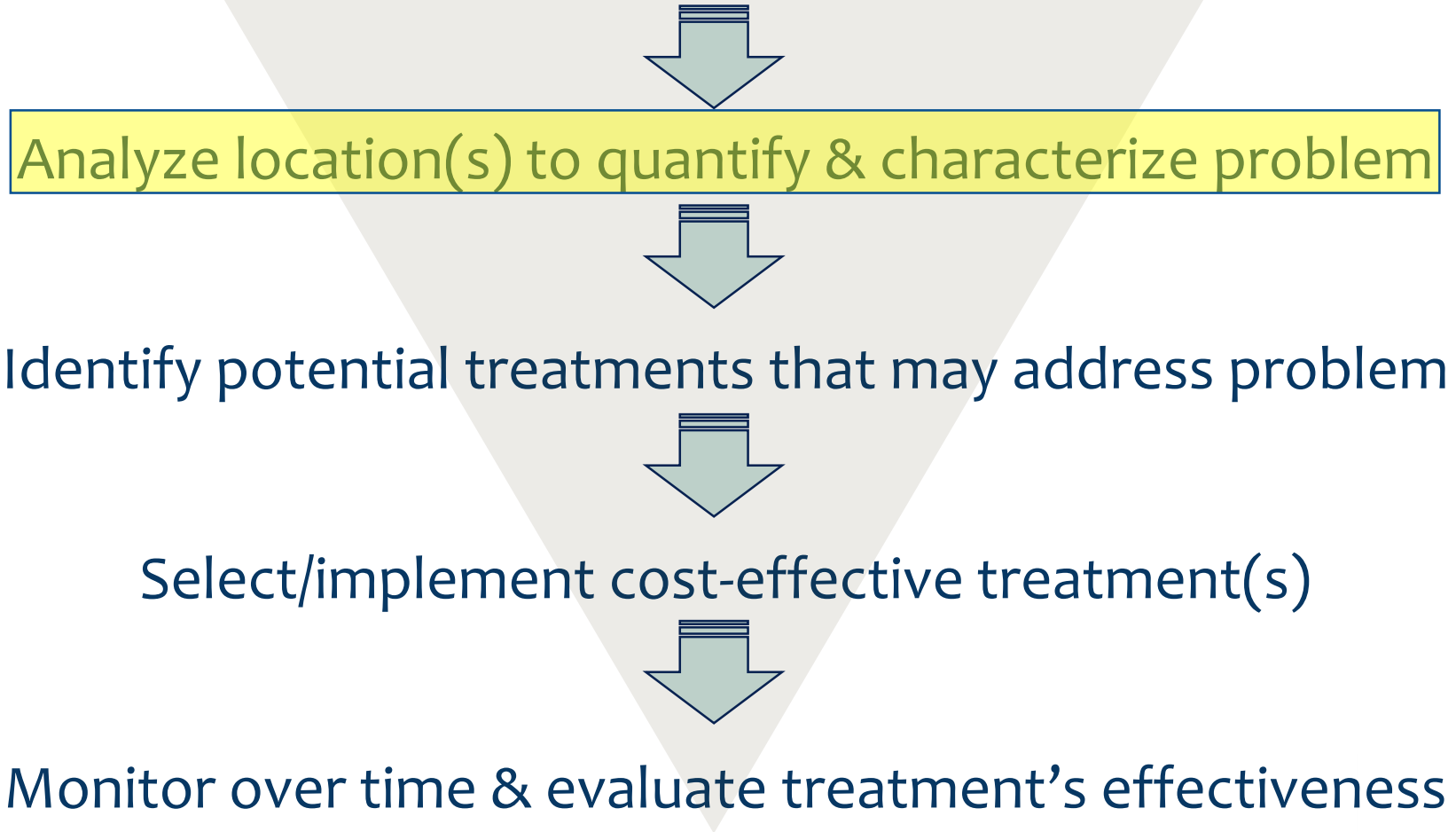
Remarks:

Action Taken By: Date:

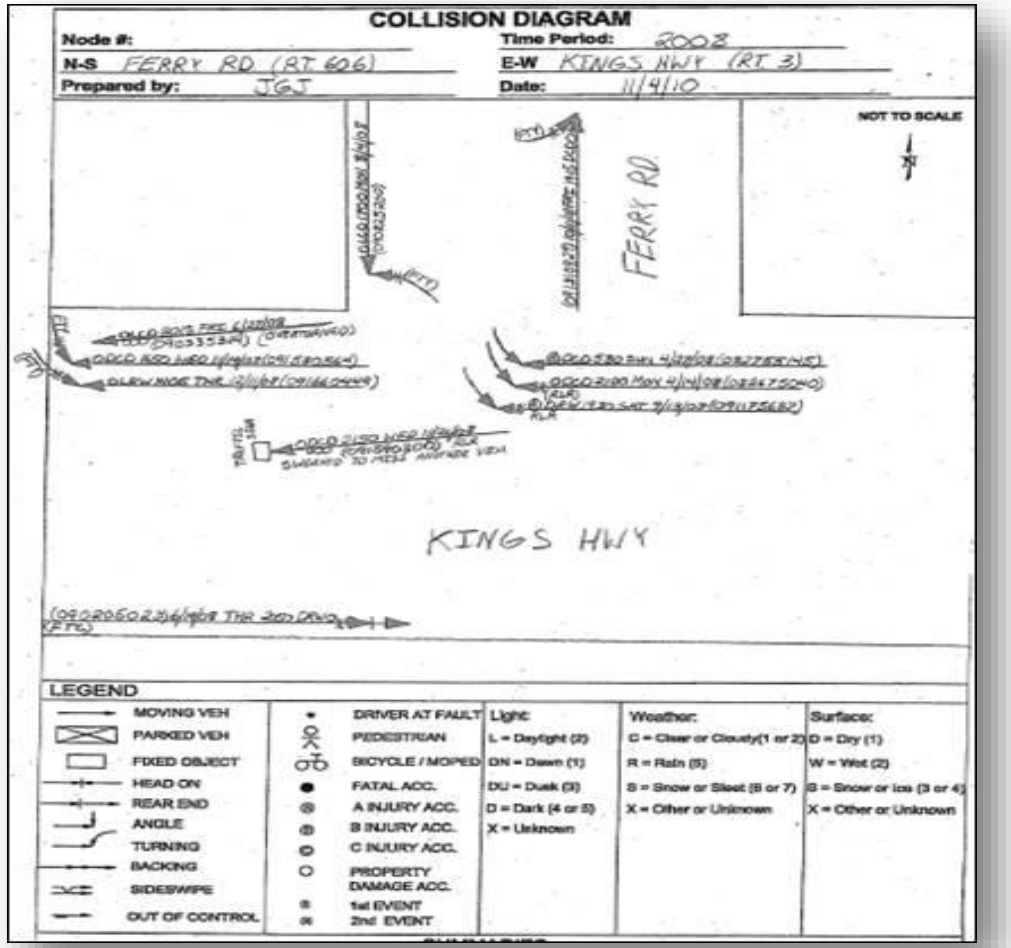
S:\R\SKMGMTLOSS CONTROL ISSUES\SSR - Special Service REquest 5-05\SSR Form 150-4D Revised 01-30-07.doc

Form 150-4D (Rev. 01/07)

5- Step Process



Collision Diagrams



- Crash type
- Time of day / weather
- Direction of travel
- Approximate location

2017 Design Training Expo

Types of Problems

Inappropriate intersection traffic control.

Inadequate visibility of the intersection or regulatory traffic control devices.

Inadequate intersection sight distance.

Inadequate guidance for motorists.

Excessive intersection conflicts within or near the intersection.

Vehicle conflicts with non-motorists.

Poor operational performance.

Misjudgment of gaps in traffic.

Speeding.

Non-compliance with intersection traffic control devices.

- Number of through lanes.
- Lane width.
- Parking lane (if present) and the presence of parking near the intersection.
- Shoulder type and width (if not curbed).
- Left-turn lane presence and length.
- Right-turn lane presence and length.
- Median type and width (if present).
- Corner radius.
- Intersecting angle.
- Approach grade.
- Horizontal curvature.
- Vertical curvature.
- Channelization.
- Curb cuts and accessible ramps.
- Pavement surface and skid resistance.
- Drainage structures and system.
- Roadside safety hardware (e.g., guardrail).
- Roadway lighting.
- One-way vs. two-way street operation.

Site review & observations

- Internet imagery is useful … but no substitute for a site visit
- Visit under differing conditions (weather, TOD, traffic, etc.)
- RSA principles offer guidance on field approach

5- Step Process

Identify problem intersection(s)

Analyze location(s) to quantify & characterize problem

Identify potential treatments that may address problem

Select/implement cost-effective treatment(s)

Monitor over time & evaluate treatment's effectiveness

Types of Treatments – List of 75 !!!

UIIG Information

- Introduction to the UIIG
- Types of Unsignalized Intersections
- Users of Unsignalized Intersections
- Improvement Process
- Types of Problems
- **Types of Treatments**
- Selection of Appropriate Control
- What Does the MUTCD Say?
- ADA and Pedestrian Considerations
- Maintenance
- Other Resources

UIIG Toolkit

Traffic Control Device Treatments

Traffic control devices include signs, signals, pavement markings, and other devices used to regulate, warn, or guide traffic. Most of these treatments are significantly less expensive than geometric changes, and some can be installed by maintenance staff or a contractor without the need for extensive engineering design. However, traffic control devices are intended to provide uniform messages and information along all public roads nationwide and, therefore, typically require the approval of the applicable governing body. The proper application of traffic control devices in the U.S. is described in the MUTCD, and a summary of what the MUTCD requires or suggests related to unsignalized intersections can be found in the UIIG's *What Does the MUTCD Say?* In addition, several states have adopted their own manual or supplement to the Federal MUTCD that should be reviewed before implementing a traffic control device if a jurisdiction is within that state. Listed below by title are the 37 traffic control device treatments that can address the various problems identified; they are grouped by the type of improvement they provide.

Intersection Control

1. Install a YIELD Sign
2. Install a STOP Sign
3. Implement All-Way Stop Control
4. Install an Intersection Control Beacon
5. Install a Stop Line
6. Install a Yield Line
7. Install a Stop Beacon
8. Install a Traffic Control Signal

Operational Improvements

9. Prohibit Turn Movements Using Signs
10. Re-Time Adjacent Traffic Signals

UiG Unsignalized Intersection Improvement Guide

Install Pavement Word and/or Symbol Markings

Pavement markings placed at or in advance of the intersection for the purpose of supplementing existing signs to guide, warn, or regulate traffic. Markings that would apply to unsignalized intersections include: STOP, YIELD, RIGHT (LEFT) TURN ONLY messages; lane-use and wrong-way arrows; and STOP AHEAD, YIELD AHEAD, SCHOOL XING, PED XING messages.

These STOP AHEAD pavement markings supplement the Stop Ahead sign.

These pavement markings remind approaching drivers of the speed limit and notify them of the impending intersection.

The STOP pavement marking along this approach adds emphasis to the stop condition.

Check for Crash Modification Factor: CMF

Targeted Crash Types

- Right-angle
- Rear-end (major road)
- Rear-end (minor road)

Problems Addressed

- Inadequate visibility of intersection or intersection traffic control devices
- Inadequate motorist guidance

Conditions Addressed

- Poor visibility of the intersection from approaches, especially when caused by vegetation or other obstacles along the road (e.g., parked vehicles).
- Crash history or observed conflicts caused by lack of awareness of intersection.
- In areas where the roadside may be "cluttered" with posted signs.

Considerations

- Symbol messages are preferable to word messages.
- Letters or numerals should be six feet or more in height. The longitudinal space between words or symbols should be at least four times the height of the characters (low speed roads) and not more than 10 times the height of the characters.
- Text presented in multiple lines should be applied such that the first word of the message is the first word a driver encounters, and no more than three lines are recommended.
- Non-slick material should be used for markings with large surfaces.
- Message may not be visible during the winter.

Industry Standard

MUTCD

Section 3B.20: Pavement Word, Symbol, and Arrow Markings

Select Examples

E. Chestnut St. & Line St., Mifflinburg, PA

Earlystown Rd. & Schempf Rd., Boalsburg, PA

Periwinkle Way & Dixie Beach Blvd., Sanibel, FL

NC 55 & NC 111, Seven Springs, NC

Other Resources

Innovative Operational Safety Improvements at Unsignalized Intersections, Florida DOT

NCHRP 500 Volume 5: A Guide for Addressing Unsignalized Intersections

Low-Cost Safety Enhancements for Stop-Controlled and Signalized Intersections, FHWA

Treatment Pages

- Description and General Considerations
- Targeted Crash Types
- Industry Standard (such as MUTCD requirements)
- Select Examples
- Resources (including any Crash Modification Factors)

UIIG
Unsignalized Intersection Improvement Guide

Add a Duplicate Regulatory or Warning Sign

Installation of a second identical regulatory or warning sign on the left-hand side of the roadway or overhead to supplement an existing sign.

Targeted Crash Types

- Right-angle
- Rear-end (major road)
- Rear-end (minor road)
- Pedestrian
- Bicyclist

Problems Addressed

- Inadequate visibility of intersection or intersection traffic control devices
- Non-compliance with intersection traffic control devices
- Vehicle conflicts with non-motorists
- Speeding

2017 Design Training Expo

Conditions Addressed

- Crash history or observed vehicle conflicts caused by non-compliance with traffic control device or lack of awareness of intersection traffic control.
- Existing sign is not conspicuous in its surroundings.
- Wide or high-speed intersection approaches.

Considerations

- Remove any visual clutter that may be inhibiting driver's view of the existing sign.
- Take care not to overuse duplicate signing, as drivers may become accustomed to their presence and fail to respond as desired.
- This treatment can be used in conjunction with other treatments to increase sign conspicuity.
- When using left-side signing on a street without a median, a centerline should be considered.

Select Examples

Auburn Knightdale Rd. & Grasshopper Rd., Knightdale, NC

E. Cave Creek Rd. & Tom Darlington Dr., Carefree, AZ

E. Maple St. & N. Central Ave., Nicholasville, KY

Other Resources

South Carolina Case Study: Systematic Intersection Improvements, FHWA

Stop Sign-Controlled Intersections: Enhanced Signs and Markings - A Winston-Salem Success Story, FHWA

The overhead STOP sign calls additional attention to the stop condition on this approach.

Industry Standard

MUTCD

Section 2A.15: Enhanced Conspicuity for Standard Signs

Section 2A.16: Standardization of Location

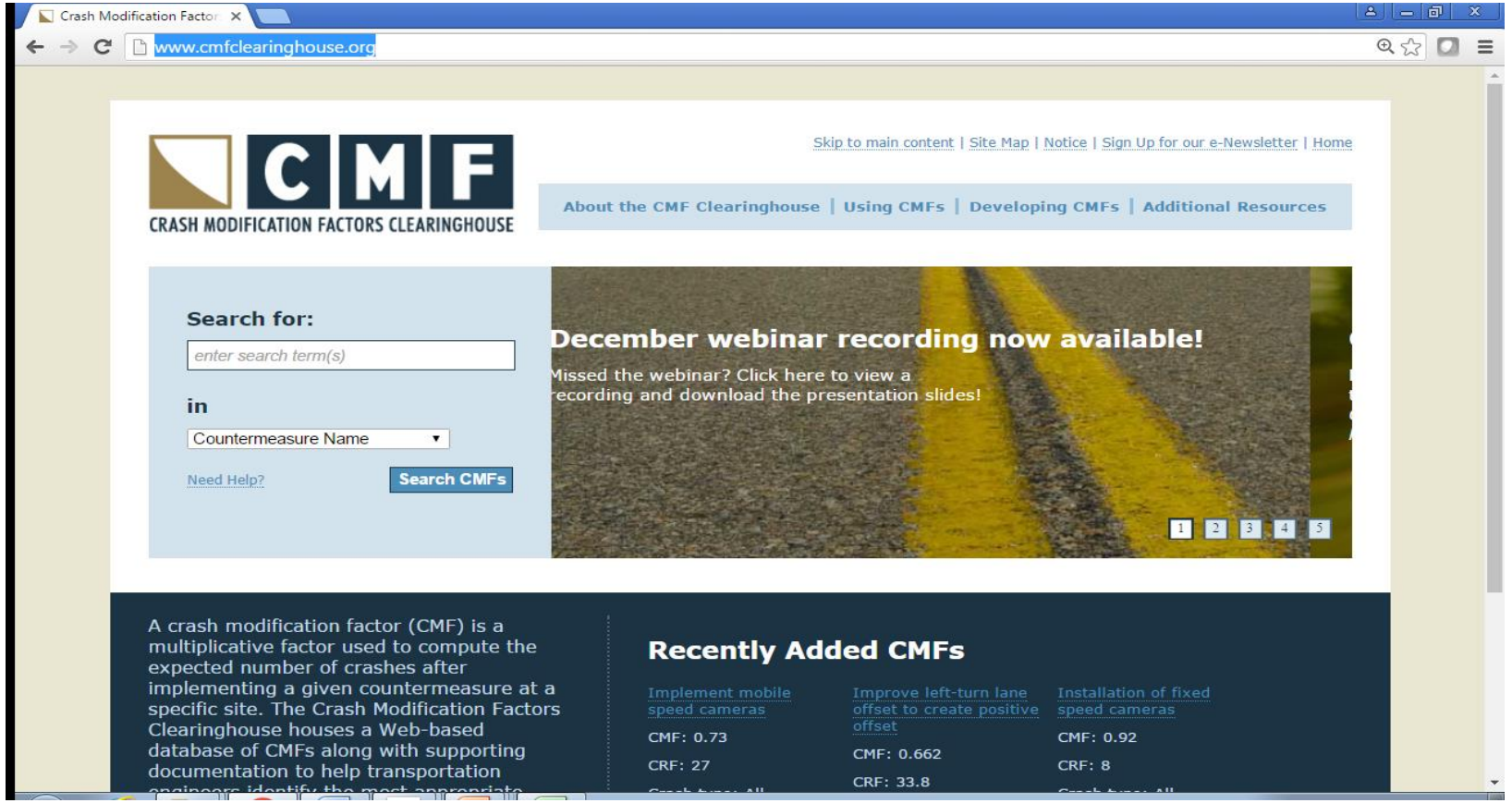
Section 2A.17: Overhead Sign Installations

Section 2A.18: Mounting Height

Check for Crash Modification Factor: CMF CRASH MODIFICATION FACTORS CLEARINGHOUSE

CMF Clearinghouse

www.cmfclearinghouse.org/



5- Step Process

Identify problem intersection(s)

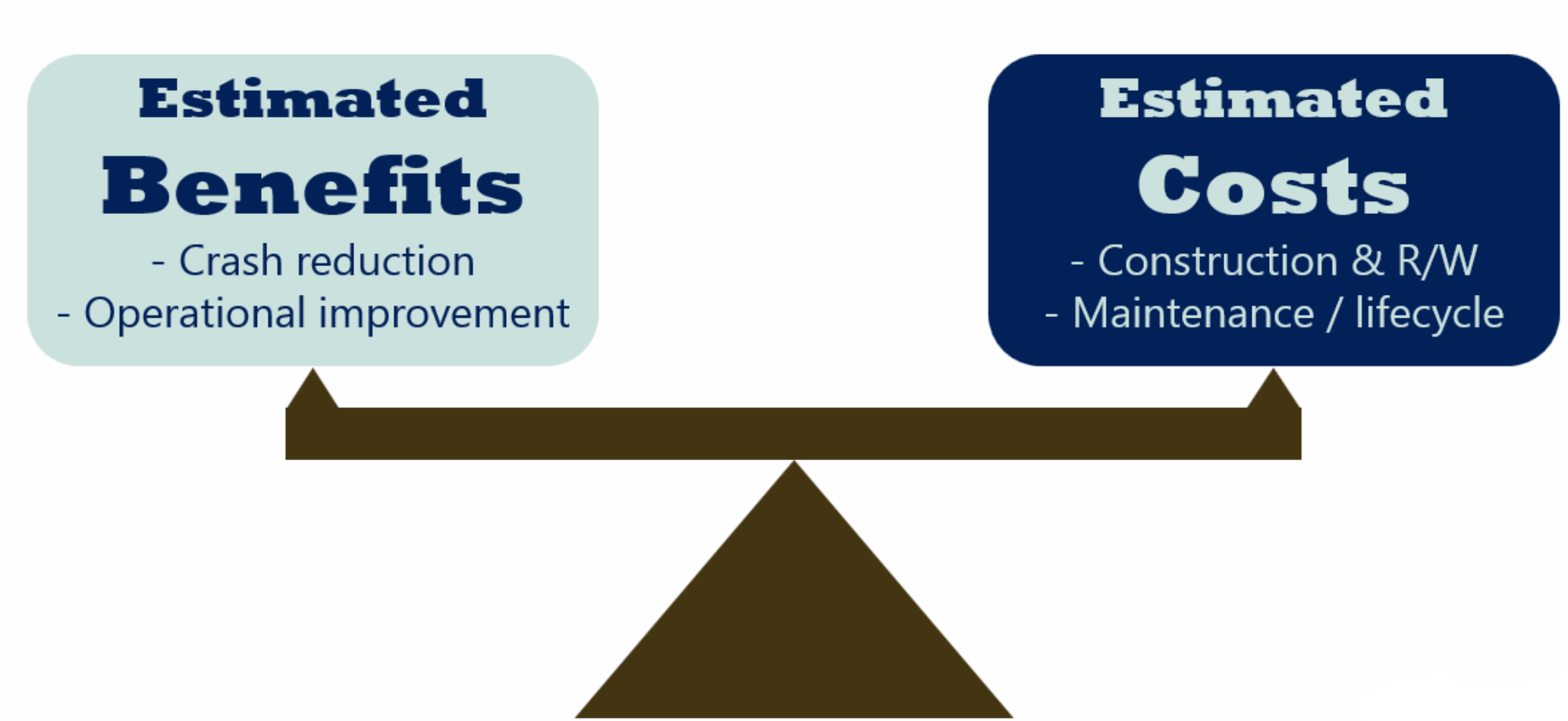
Analyze location(s) to quantify & characterize problem

Identify potential treatments that may address problem

Select/implement cost-effective treatment(s)

Monitor over time & evaluate treatment's effectiveness

Emphasis on Benefit / Cost



Systemic Safety

- Since many UIIG treatments are low-cost, potential exists to apply them on a **systemic approach**
    - Particularly applicable when crashes are widely scattered over many intersections (e.g., in very rural areas)
    - Proactive vs. reactive
        - Mitigate risk factors that increase the likelihood of a severe crash even if one hasn't occurred

Systemic example

- STOP AHEAD pavement marking
- Double-up warning signs
- Retroreflective stripe on sign post

5- Step Process

Identify problem intersection(s)

Analyze location(s) to quantify & characterize problem

Identify potential treatments that may address problem

Select/implement cost-effective treatment(s)

Monitor over time & evaluate treatment's effectiveness

Monitor effectiveness over time

- Improvement process does not end at implementation
- Determine if situation has improved
- Consider …
  - Not only crash data but also perspective of law enforcement, others
  - Follow-up with person(s) who originally notified agency of problem

UIIG Information

- Introduction to the UIIG
- Types of Unsignalized Intersections
- Users of Unsignalized Intersections
- Improvement Process
- Types of Problems
- Types of Treatments
- Selection of Appropriate Control
- What Does the MUTCD Say?
- ADA and Pedestrian Considerations
- Maintenance
- Other Resources

UIIG Toolkit

What Does The MUTCD Say?

BACKGROUND

The *Manual on Uniform Traffic Control Devices for Streets and Highways* (MUTCD) is a document issued by the Federal Highway Administration (FHWA) to be used by Federal, state, and local agencies to ensure that traffic control devices—signs, signals, markings, or other devices used to regulate, warn, or guide traffic—are designed, installed, and applied consistently across the U.S. It does this by providing standards, guidance, options, and support information as defined below:

- **Standard**—a statement of required, mandatory, or specifically prohibitive practice regarding a traffic control device. The verb "shall" is typically used.
- **Guidance**—a statement of recommended, but not mandatory, practice in typical situations, with deviations allowed if engineering judgment or engineering study indicates the deviation is appropriate. The verb "should" is typically used.
- **Option**—a statement of practice that is a permissive condition and carries no requirement or recommendation. The verb "may" is typically used.
- **Support**—an informational statement that does not convey any degree of mandate, recommendation, authorization, prohibition, or enforceable condition.

Most states have, at some level, developed their own sets of standards for traffic control devices, but these must substantially conform to the Federal MUTCD. The map below was developed by the FHWA's MUTCD Team and summarizes information on which states have adopted (1) the national MUTCD, (2) the national MUTCD along with a state-specific supplement, or (3) a state-specific MUTCD.

UIIG Information

- Introduction to the UIIG
- Types of Unsignalized Intersections
- Users of Unsignalized Intersections
- Improvement Process
- Types of Problems
- Types of Treatments
- Selection of Appropriate Control
- What Does the MUTCD Say?
- ADA and Pedestrian Considerations
- Maintenance
- Other Resources

UIIG Toolkit

ADA and Pedestrian Considerations

GENERAL

Enacted by the U.S. Congress in 1990, the Americans with Disabilities Act (ADA) made it illegal to discriminate against persons with disabilities. The law mandates that all public spaces—including transportation facilities—accommodate persons with disabilities. Several measures to aid persons with disabilities may be applied at an intersection and to the entire sidewalk network. Perhaps most notable are curb ramps, detectable warning surfaces, and accessible pedestrian signals at signalized intersections.

While the guidelines and requirements presented by the U.S. Access Board represent the minimum provisions in the U.S., local stipulations may be more stringent, depending on the jurisdiction; therefore, local regulations should always be considered to ensure that all applicable ADA requirements are being satisfied.

APPLICATIONS FOR UNSIGNALIZED INTERSECTIONS

Sidewalks

A sidewalk network aids all pedestrians by giving them a designated safe place to travel while in close proximity to motor vehicles. Maintaining a smooth sidewalk surface free of obstructions helps to eliminate tripping hazards, especially for visually impaired pedestrians, and makes the path easier to traverse for all users, particularly persons using a wheelchair, cane, or other mobility assistance device. Sidewalks characterized by excessive cracks, holes, or sections dislodged by tree roots or settling present safety issues to pedestrians, as do sidewalk obstructions in the form of overgrown vegetation, street furniture, or debris. Any of these conditions should be addressed as soon as possible through proper maintenance activities. More information on these issues and on specific sidewalk design details (e.g., width requirements, proper grades and cross slopes, and surface materials) can be found in FHWA's *Accessible Sidewalks and Street Crossings—An Informational Guide*.

Curb Ramps

Curb ramps offer the crossing pedestrian an entrance to and exit from the crosswalk through a gradual transition from the sidewalk elevation to the street. The sidewalk area near the curb ramp needs to have adequate space for a person in a wheelchair and be free of obstructions to allow proper sightlines. Shrubs and bushes at the crossing location should not hinder the lines of sight between a person in a wheelchair and drivers or cyclists.

UIIG Information

- Introduction to the UIIG
- Types of Unsignalized Intersections
- Users of Unsignalized Intersections
- Improvement Process
- Types of Problems
- Types of Treatments
- Selection of Appropriate Control
- What Does the MUTCD Say?
- ADA and Pedestrian Considerations
- Maintenance
- Other Resources

UIIG Toolkit

Maintenance

Proper maintenance of the roadway and its traffic control devices can forestall or ameliorate some of the problems identified in this Guide. Agencies should have a scheduled maintenance program that includes the activities noted below, as a minimum.

RESTRIPE DETERIORATED PAVEMENT MARKINGS

Pavement markings using paint-based materials have a relatively short service life—one to two years depending upon the material type, climate, and traffic volume. Those using other materials (e.g., thermoplastic, epoxy, preformed plastic markings) have a substantially longer service life. To maintain their effectiveness, pavement markings need to be discernible, especially during nighttime and limited-visibility conditions. Agencies should have an inspection and restriping program to ensure that pavement markings provide the visibility that is needed by motorists. Further information on pavement marking visibility can be found on the FHWA Office of Safety Website.

Worn stop line should be restriped. *Source: VHB.*

REPLACE FADED, DAMAGED, OR MISSING SIGNS

The various standard signs discussed in the *Unsignalized Intersection Improvement Guide* (UIIG) are visible at night because they are made with retroreflective sheeting material; few, if any, are illuminated by external lighting. The composition of the sheeting material has changed over the years to provide brighter and longer-lasting signs. However, all signs will deteriorate over time, eventually losing their color and retroreflectivity such that they no longer provide adequate recognition or visibility distance for the motorist. MUTCD Section 2A.08 (Maintaining Minimum Retroreflectivity) requires that "public agencies or officials having jurisdiction shall use an assessment or management method that is designed to maintain sign retroreflectivity at or above the minimum levels in Table 2A-3" and identifies the following five methods for managing sign retroreflectivity:

- Visual nighttime inspection.
- Measured sign retroreflectivity using a retroreflectometer.
- Expected sign life.
- Performance of control group of signs.
- Blanket replacement.

UIIG Information

- Introduction to the UIIG
- Types of Unsignalized Intersections
- Users of Unsignalized Intersections
- Improvement Process
- Types of Problems
- Types of Treatments
- Selection of Appropriate Control
- What Does the MUTCD Say?
- ADA and Pedestrian Considerations
- Maintenance
- Other Resources

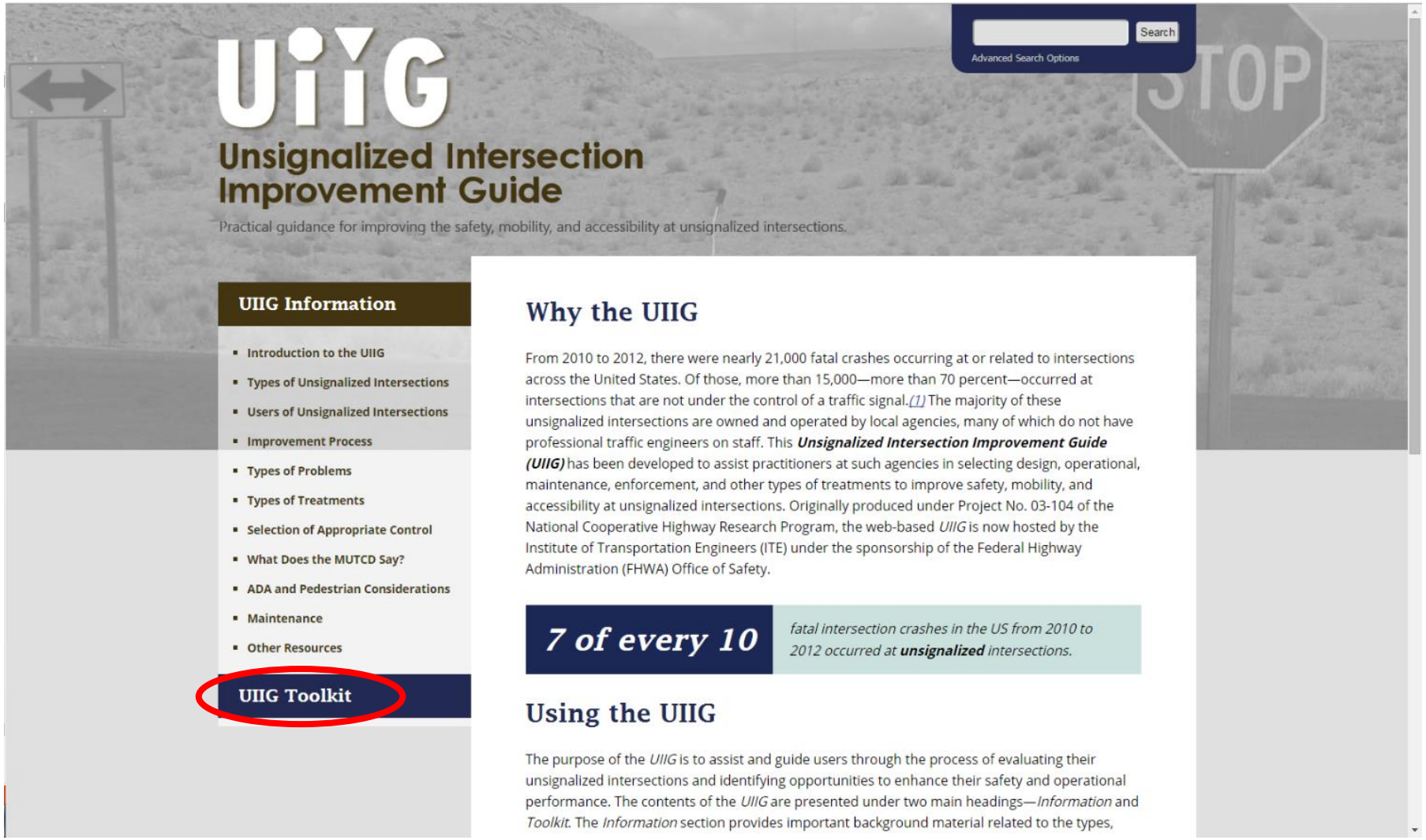
UIIG Toolkit

Other Resources

Throughout the Guide links have been provided to resources that provide more detailed information. Additional information is available for unsignalized intersections for the following topics relevant to unsignalized intersection improvements:

- Access management.
- Alternative intersections.
- Crash data and analysis.
- Design.
- FHWA Intersection Safety Implementation Plans (ISIPs).
- Human factors.
- Intersection case studies.
- Non-motorized users:
  - Bicyclists.
  - Pedestrians.
  - Safe Routes to School.
- Operations.
- Road Safety Audits.
- Rural roads.
- Traffic calming.
- Types of drivers.

UIIG Toolkit



2017 Design Training Expo

- Citizen Traffic Service Request Form
- Assessment and Inventory Form
- Treatment Alternatives Filter
- Treatment Alternatives Matrix
- Treatment Keyword Search
- Complete List of Treatments

UIIG Toolkit

The following UIIG tools have been developed to provide practitioners with applications and examples related to the assessment and enhancement of unsignalized intersections.

UIIG Citizen Traffic Service Request Form

This document can serve as an example and a starting point for agencies desiring to establish a mechanism for inviting and accepting feedback from the general public on perceived issues concerning their road networks.

UIIG Intersection Assessment and Inventory Form

This spreadsheet enumerates a variety of data elements related to the physical and operational characteristics of an unsignalized intersection and provides an interface through which they can be entered and cataloged.

UIIG TREATMENT SELECTION TOOL

Seventy-five (75) engineering and enforcement treatments for unsignalized intersections are identified in the UIIG and described by individual fact sheets. Users may access these fact sheets in four ways:

Treatment Alternatives Filter

Find treatment alternatives based on the specific characteristics of your intersection of interest.

Keyword Search

Find treatment alternatives by conducting a basic keyword search of all treatment sheets.

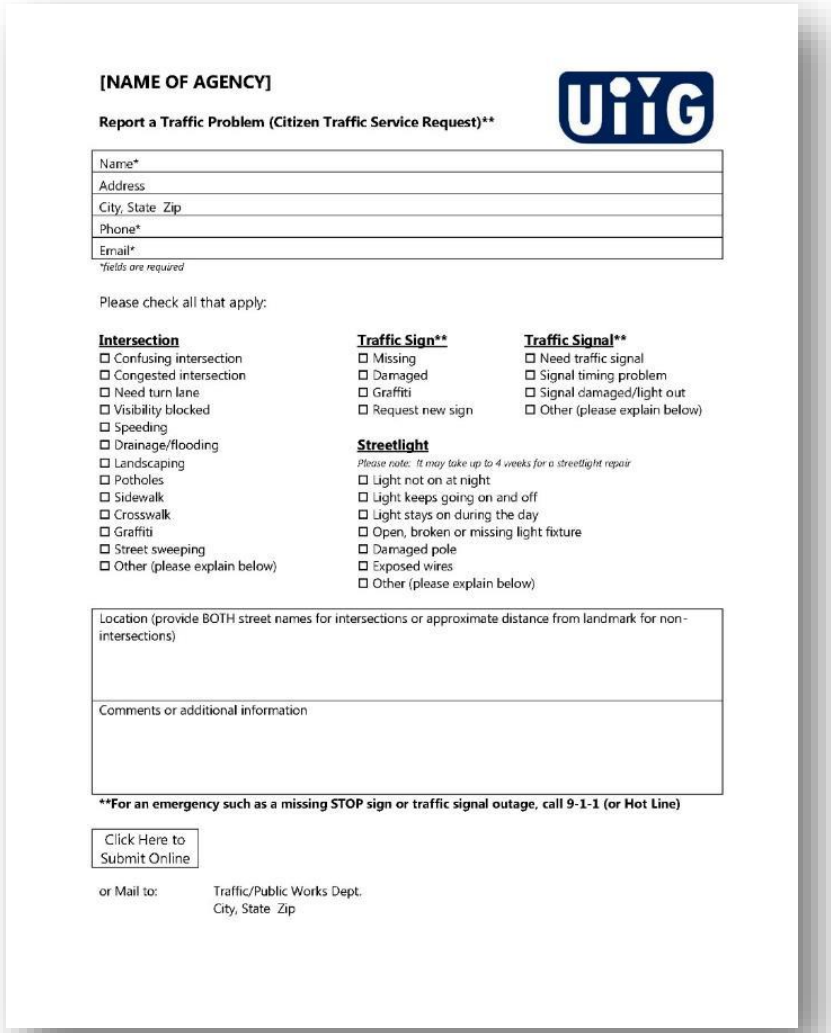
Treatment Alternatives Matrix

Find treatment alternatives based on a combination of problem type and treatment type.

Treatments - Complete List

View a complete listing of all 75 UIIG treatments.

Citizen Traffic Service Request Form



[NAME OF AGENCY]

Report a Traffic Problem (Citizen Traffic Service Request)**

Name*
Address
City, State Zip
Phone*
Email*

**fields are required*

Please check all that apply:

Intersection
- ☐ Confusing intersection
- ☐ Congested intersection
- ☐ Need turn lane
- ☐ Visibility blocked
- ☐ Speeding
- ☐ Drainage/flooding
- ☐ Landscaping
- ☐ Potholes
- ☐ Sidewalk
- ☐ Crosswalk
- ☐ Graffiti
- ☐ Street sweeping
- ☐ Other (please explain below)

Traffic Sign**
- ☐ Missing
- ☐ Damaged
- ☐ Graffiti
- ☐ Request new sign

Traffic Signal**
- ☐ Need traffic signal
- ☐ Signal timing problem
- ☐ Signal damaged/light out
- ☐ Other (please explain below)

Streetlight

Please note: It may take up to 4 weeks for a streetlight repair
- ☐ Light not on at night
- ☐ Light keeps going on and off
- ☐ Light stays on during the day
- ☐ Open, broken or missing light fixture
- ☐ Damaged pole
- ☐ Exposed wires
- ☐ Other (please explain below)

Location (provide BOTH street names for intersections or approximate distance from landmark for non-intersections)
Comments or additional information

****For an emergency such as a missing STOP sign or traffic signal outage, call 9-1-1 (or Hot Line)**

Click Here to Submit Online

or Mail to: Traffic/Public Works Dept.
City, State Zip

- Available from Toolkit as PDF or Word document

- Useful for agencies with no formal mechanism to capture public feedback

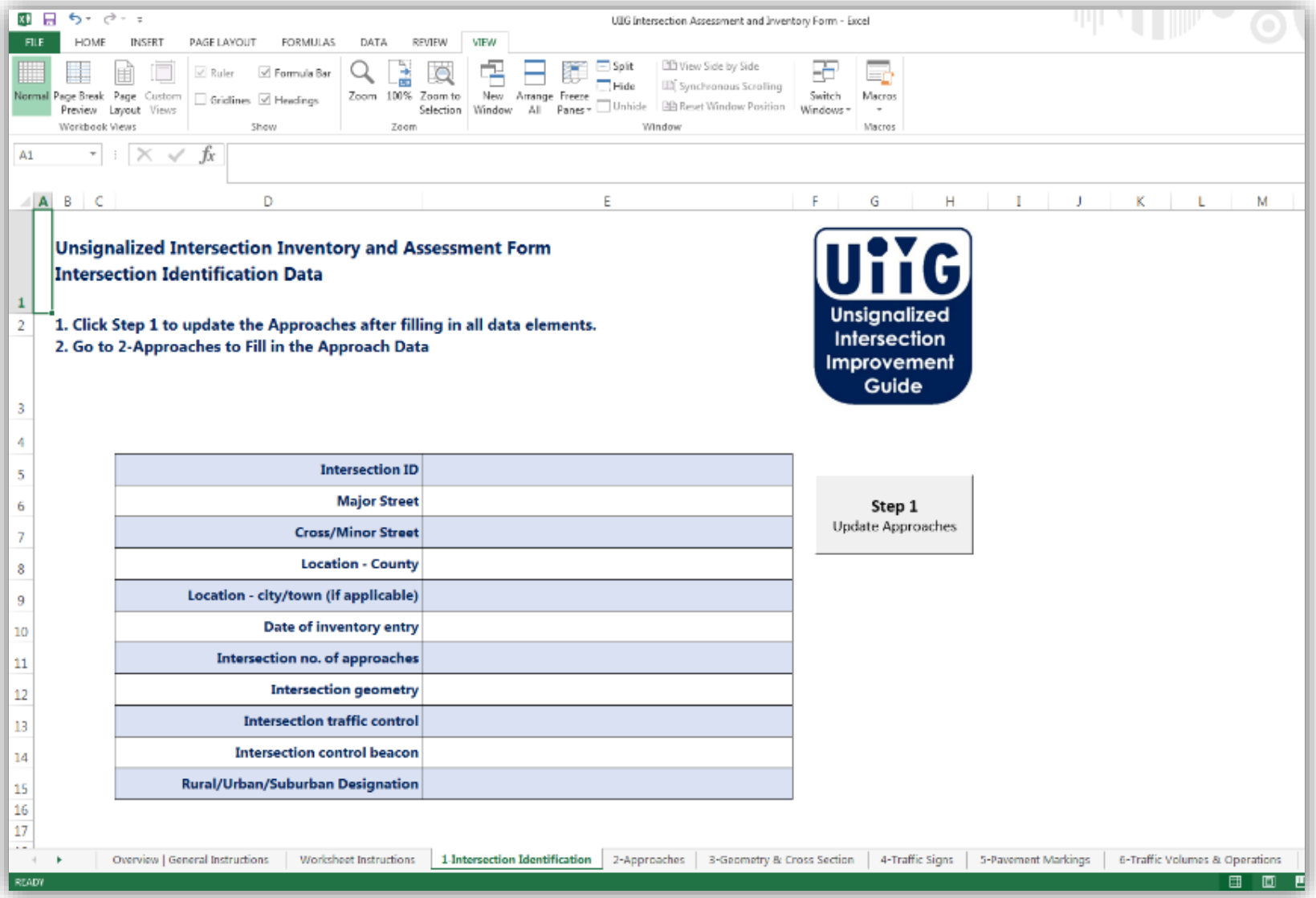
2017 Design Training Expo

Intersection assessment & inventory form

- Downloadable Microsoft Excel spreadsheet
  - Includes detailed instructions
  - 10 data tabs spanning multiple subjects
  - Final tab compiles all data inputs into single table

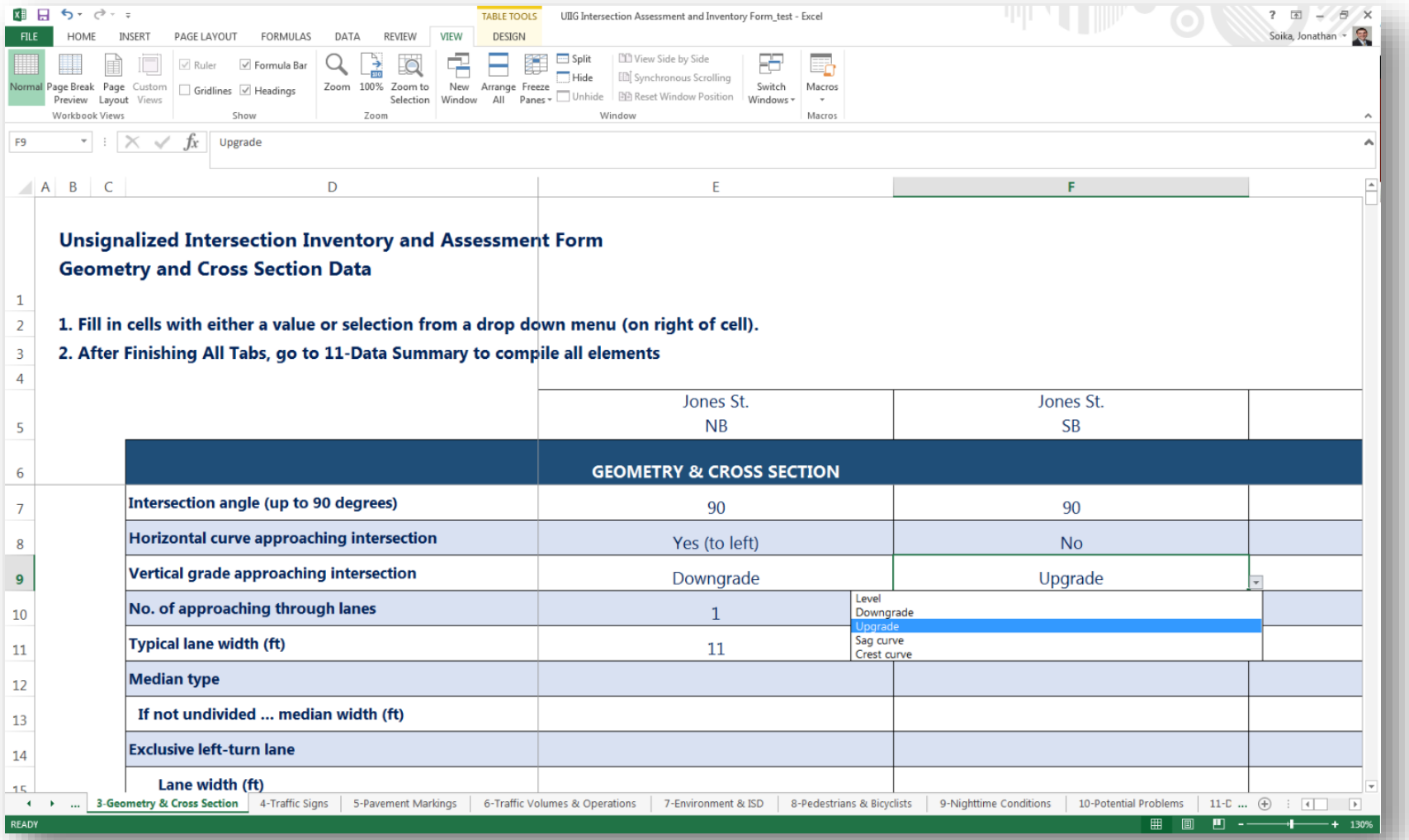
- Two primary purposes:
  1) Present **comprehensive list of data elements** related to the safety, operations, and access of unsignalized intersections
  2) Provide **user-friendly interface** through which data can be entered and catalogued

Intersection assessment & inventory form



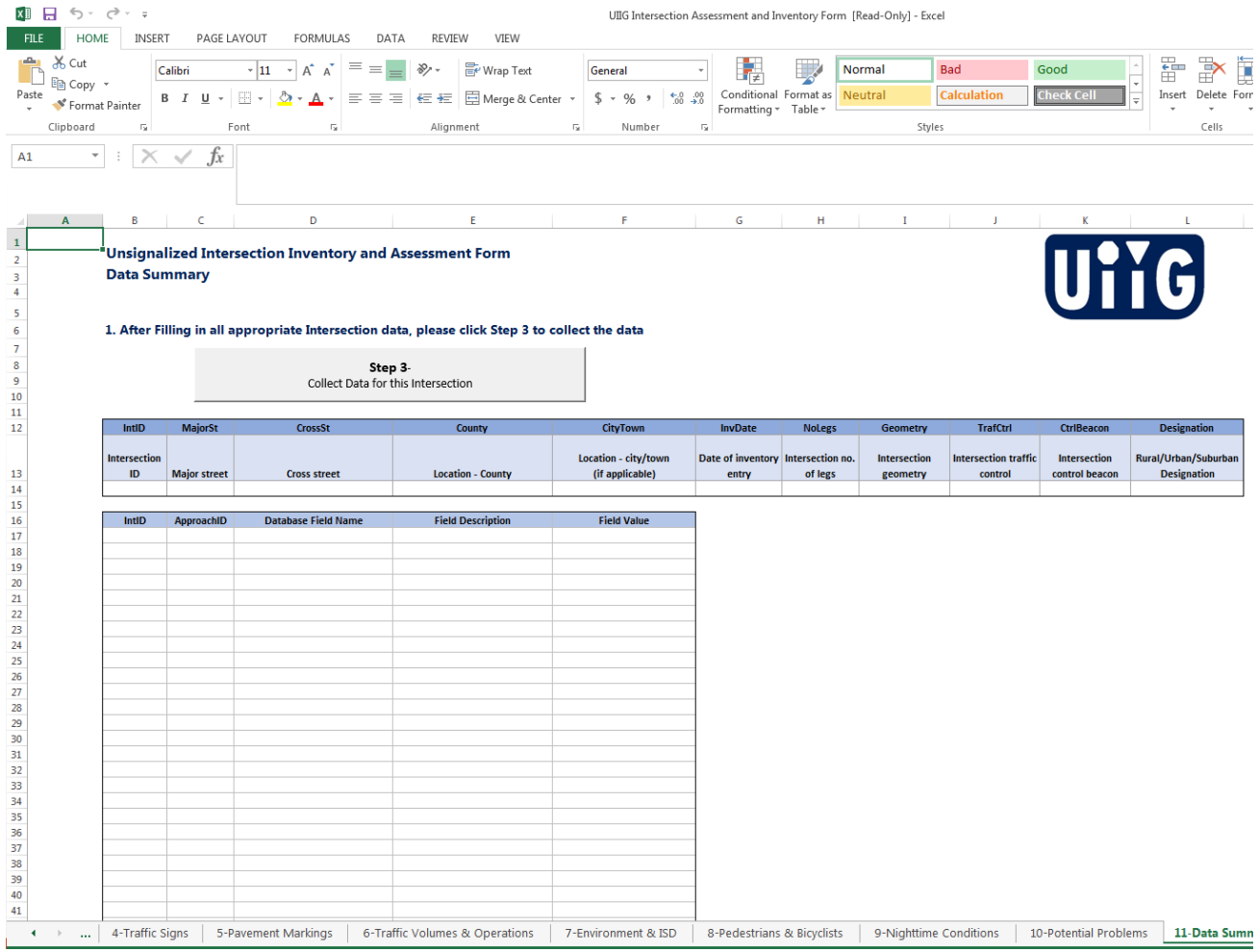
2017 Design Training Expo

Intersection assessment & inventory form: Geometry tab



2017 Design Training Expo

Intersection assessment & inventory form: Data Summary tab



Treatment Alternatives Filter

HOW TO USE THE FILTER

To obtain a more tailored listing of potential UIIG treatments for the intersection of interest, answer one or more of the following questions and click on the GET TREATMENTS button below. The treatment alternatives stemming from the user's responses will be presented at the bottom of the page. Click on a treatment name to view its corresponding description sheet.

In what type of area is the intersection located?

- ○ Urban Central Business District
- ○ Urban Other
- ○ Suburban
- ○ Rural
- ◉ Not Applicable

What is the approximate vehicular volume along the major road (expressed in average daily traffic [ADT])?

- ○ 400 or less
- ○ between 400 and 5,000
- ○ between 5,000 and 10,000
- ○ More than 10,000
- ◉ Not applicable

How are the major road approaches characterized?

- ○ Single Lane
- ○ Multi Lane
- ◉ Not Applicable

What specific crash types are being targeted at the intersection?

- ☐ Right-angle
- ☐ Opposing left turn
- ☐ Rear-end (major road)
- ☐ Rear-end (minor road)
- ☐ Sideswipe, same direction
- ☐ Sideswipe, opposite direction
- ☐ Head-on
- ☐ Pedestrian
- ☐ Bicyclist
- ☐ Single vehicle / run off road

What problem type(s) may exist at the intersection?

- ☐ Inappropriate intersection traffic control
- ☐ Inadequate visibility of intersection or regulatory traffic control devices
- ☐ Inadequate intersection sight distance
- ☐ Inadequate motorist guidance
- ☐ Excessive intersection conflicts
- ☐ Vehicle conflicts with non-motorists
- ☐ Poor operational performance

What general treatment types will be considered at the intersection?

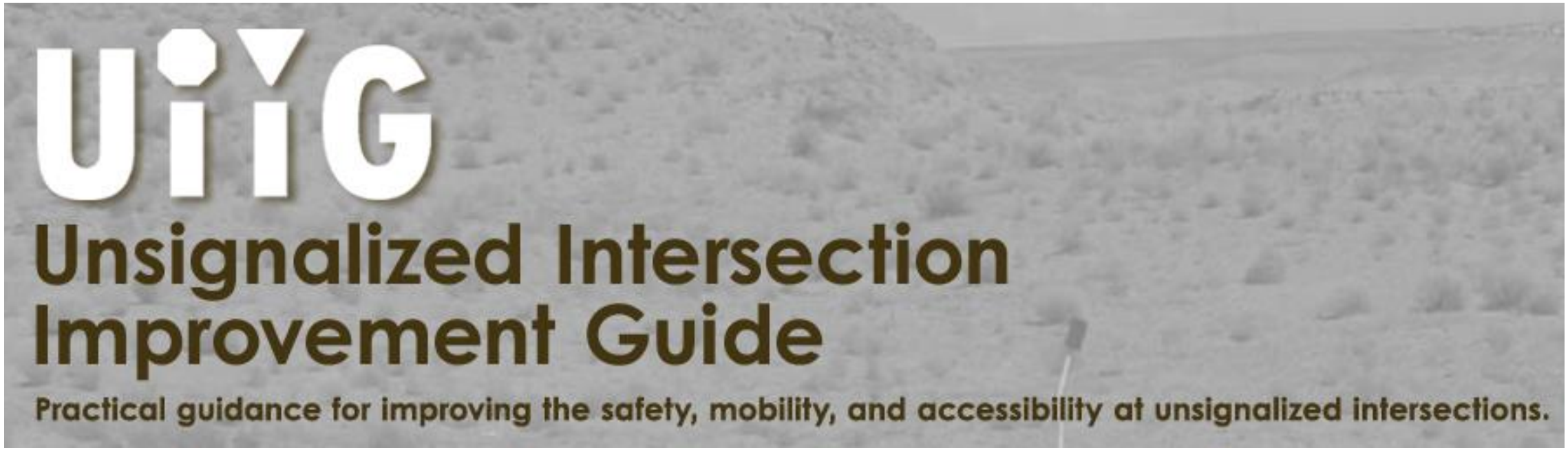
- ☐ Traffic Control Devices
- ☐ Geometric improvements
- ☐ Roadside/ shoulder
- ☐ Pavement surface
- ☐ Other engineering
- ☐ Enforcement

RESULTS LISTED HERE, SELECT A LINK FROM THE MATRIX BELOW...

Select from the matrix of links below:

UIIG Treatment Type ▶ / UIIG Problem Type ▼	Traffic Control Devices	Geometric Improvements	Roadside/ Shoulder	Pavement Surface	Other Engineering	Enforcement
Inappropriate Intersection traffic control	X	X				
Inadequate visibility of intersection of TCDs	X	X	X	X		
Inadequate intersection sight distance	X	X	X		X	
Inadequate motorist guidance	X	X				
Excessive intersection conflicts	X	X	X		X	
Vehicle conflicts with pedestrians and/or bicyclists	X	X	X		X	
Poor operational performance (congestion or insufficient gaps in traffic flow)		X	X		X	
Misjudgment of gaps		X			X	
Speeding	X	X		X		X
Non-compliance with intersection traffic control device(s)		X		X		X

Check it out !!!



www.ite.org/uiig

2017 Design Training Expo